

(This section to be completed by subcontractor requesting document)

TIMOTHY BENNETT I 1034A  
Requestor Document Center (Is requested to provide the following document)

Date of request 10/12/95 Expected receipt of document 1 MONTH

Document number KP-663 Date of document 10/13/54

Title and author (if document is unnumbered)

(This section to be completed by Document Center)

Date request received 10/20/95

Date submitted to ADC 11/2/95

Date submitted to HSA Coordinator 10/20/95

(This section to be completed by HSA Coordinator)

Date submitted to CICO 11/2/95

Date received from CICO 1/11/96

Date submitted to ChemRisk/Shonka and DOE 1/16/96

(This section to be completed by ChemRisk/Shonka Research Associates, Inc.)

Date document received \_\_\_\_\_

Signature \_\_\_\_\_

10-11-68 Site

~~CONFIDENTIAL~~

-2-

## B. Cold Trap Instrumentation:

### 1. Temperature Controls and Instruments:

The thermocouples mentioned above are tied into a Bristol recording controller. The nozzle heaters, insertion heaters, shell heaters - inlet end and shell heaters - outlet end are individually controlled in K-29 so that if any one of these temperatures exceeds 235°F, the heaters concerned will be cut off. If any temperature exceeds 250°F, all heaters will be cut off and a visible and audible alarm will sound. If the trap pressure exceeds 30 psig, the output of a 0-75 PBM will actuate a visible and audible alarm and also cut off all heaters.

The trap heaters are controlled by three methods: (1) By the Bristol recording controller as described above, (2) by percent input controllers which are set by operations to control the time that the heaters are on - from 0 to 60 seconds per minute, and (3) by variac controllers on each heater which can be set at any desired voltage to the heaters.

### 2. Pressure Controls and Instruments:

The pressure to the 4" cold trap inlet header is controlled by two air to open control valves, with a 4" by-pass line which can be used if desired. The trap inlet header pressure is measured by a 0-10 PBM, the output of which goes to a recording controller which may be set to maintain any desired pressure from 0 to 10 psia. The two control valves are one-half and one inch. The one-half inch valve operates on an output from the controller of 4-10 psig and the one inch valve on an output of 9-15 psig.

Each cold trap has a pressure probe on the inlet line which runs to a 0-5 psia PBM and recorder, a 0-25 psia PBM and recorder, and a 0-10 DBM which measures the pressure drop across the trap. The other side of this DBM is tied into the trap discharge line.

There is a pressure probe near the top center of each trap which is tied into a 0-75 PBM and a PR. This is the PBM which actuates the heater cut-out and alarm mentioned in B-1 above.

## C. Beach Russ Pumps

### 1. Description

There are four 50 cfm Beach-Russ pumps and one 250 cfm pump which may be used singly or collectively. The pumps may be valved so that they pump into or pull from or by-pass the cold traps. All pumps are to be filled with MFL oil (maximum permissible quantity= 1 gallon). The pumps are equipped with strip heaters on the pump bases, oil separators and mist filters and with calrod heaters on all oil lines.

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

-3-

The strip heaters on the pump bases and oil separators are automatically energized when the pumps are shut down and de-energized when the pumps are started. All other heaters are controlled by mercoids.

Each pump has water coils on the pump jacket through which recirculating water is pumped by means of a centrifugal pump tied into the unit two return line. This water should circulate continuously to prevent lines plugging. The water cooling of the 250 CFM pump limits the assay of material fed to this pump.

A solenoid valve (on the suction line of each pump), which closes automatically on pump shut-down, prevents "blow-back" of oil to the pump suction header and trapping system.

One-half inch monel lines and valves have been installed in the pump suction and discharge headers in order to drain oil from these lines.

## 2. Controls and Instrumentation

Two air to open control valves ( $1\frac{1}{2}$ " and 2") on the pump suction header, operated in parallel, regulate the pump suction header at any desired pressure between zero and five psia. A 0-5 PBM on the downstream side of these control valves is tied into a pressure recording controller. The  $\frac{1}{2}$ " valve operates on 4-10 psig output from the controller and the 2" valve operates on 9-15 psig output.

The pump discharge pressure is measured between the mist filter and oil separator by means of a 0-25 PBM and a P.I. The output of this PBM also goes to a mercoid which is set at 23 psia, to sound visual and audible alarms, close the solenoid valve in the pump suction line and shut down the pump.

## D. Alumina Traps

### 1. Description

There are two banks of always safe alumina traps consisting of nine traps per bank. In normal operation all eighteen traps should be used. This gives a retention time of two seconds for maximum pumping rate. Each trap is charged with forty pounds of activated alumina and is barricaded to prevent inter-reaction during trap removal, which should be done one trap at a time.

### 2. Instrumentation

The main inlet and outlet headers to the alumina traps have pressure probes which are tied into a 0-1 DBM used to measure the differential pressure across the traps. There are also compound gauges on the

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

-4-

inlet and outlet lines to each bank of traps.

The inlet temperature to the alumina traps and the outlet temperature from each bank are recorded on a Bristol recorder. An alarm is provided to warn of increased temperature. The set point of this alarm will be determined after the system has been placed in use.

E. Oil Bubblers

*NOT USE*

There are two banks of five oil bubblers each, originally intended to remove chlorine trifluoride or fluorine from the purge gases before going to the pumps. However, since the use of hydrocarbon oil in the system has been found to be impossible, the main block valves to the bubblers have been closed and tagged. These valves should not be opened.

F. Space Recorder

The space recorder is an instrument designed to monitor the exhaust gases for  $UF_6$  as they pass out of the system to atmosphere. In K-29 the inlet line to the space recorder can is tied into the outlet line from the air jet. To create a differential pressure and make it possible to establish a flow and regulated pressure in the can, there are two outlet lines from the can, either of which may be used. One line runs to the pump suction header and the other to the alumina trap inlet line. The pressure in the can is maintained automatically by a controller, the output of which regulates a control valve on the inlet line. Can pressure is read on a 0-20 range P.I.

G. Refrigeration System

For a complete description of this equipment and operation refer to the operating procedure for the freon-114 recovery unit. A surge drum has been added to this system to facilitate the control of the refrigerant flow to the cold traps. Gaseous freon is compressed in high and low stage compressors to 120 psig, condensed and cooled. The liquid freon then flows to the surge drum where partial vaporization further cools the liquid to  $-60^{\circ}F$  and reduces the pressure to 5.3 psia. The liquid enters the drum on the side and drains from the bottom to the cold traps where it is vaporized partially or completely and flows back into the top side of the surge drum. The drum contains baffles which remove any entrained liquid. The vapor is removed from the top of the drum to the suction of the low stage compressor.

A 0-1 range DBM measures the liquid level in the surge drum. This is controlled by a float valve in a small drum located just north of

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

the surge drum. On the west side of the small drum there is located a Phillips float control valve. The level in the surge drum is regulated by turning this valve. A thermometer is installed in the liquid outlet from the surge drum. There is a pressure gauge on the surge drum and the inlet line to each trap.

SAThompson/bw

October 13, 1954

~~CONFIDENTIAL~~